

REMARKS

The Final Office Action has been reviewed and the Examiner's comments carefully considered. Applicant submitted an Amendment After Final, dated October 27, 2010; however, it was only entered for purposes of appeal. Examiner's reasoning on how the claims submitted with the Amendment After Final would have been addressed during appeal is provided in the Advisory Action Before the Filing of an Appeal Brief dated November 10, 2010. Claims 27-33 remain in this application. Claim 27 has been amended. Claims 1-26 have been cancelled. No new subject matter is believed to have been added by this Amendment.

Claim Objections

In the final Office Action, the Examiner objects to claims 31-33 under 37 C.F.R. § 1.75(c) as being of improper dependent form. Claims 31-33 have been amended in the Amendment After Final to address this concern.

Additionally, the Examiner objects to claims 28 and 31-33 for certain informalities. These claims have also been amended in the Amendment After Final to address these informalities.

In view of the foregoing, reconsideration and withdrawal of the objections to the above claims are respectfully requested.

Rejections Under 35 U.S.C. § 112:

Claims 27-33 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Multiple examples are cited in Section No. 4 of the Office Action and each of these examples has been addressed in the Amendment After Final through corresponding amendments to the claims. Applicant respectfully requests reconsideration and withdrawal of the above rejections.

Rejections Under 35 U.S.C. § 103:

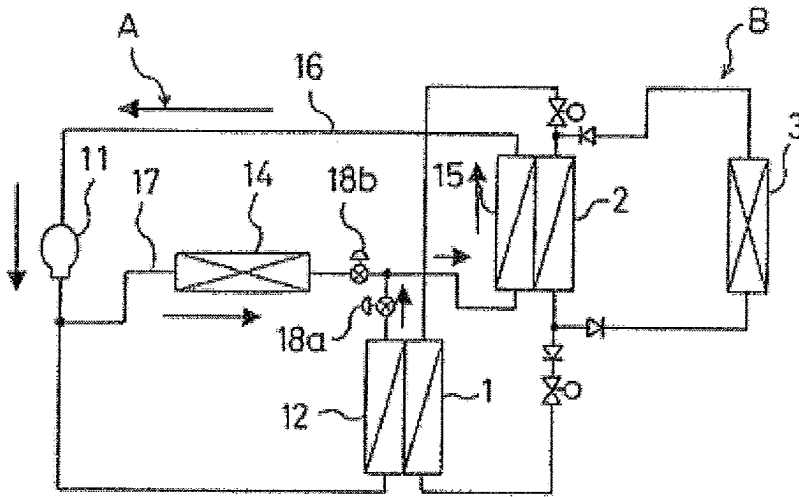
Claims 27-29, 31, and 32 stand rejected under 35 U.S.C. § 103(a) as being obvious over United States Patent No. 6,116,035 to Tanaka et al. (hereinafter "Tanaka") in view of the teaching of United States Patent No. 6,425,262 to Pomme (hereinafter "Pomme").

With regard to the Tanaka patent, the Examiner refers to Fig. 45 and explains that the Tanaka patent discloses a refrigeration plant and operating method, which comprises in a refrigeration circuit (A), a compressor (11), a condenser (14), an injection valve (18b), and an evaporator (heat exchangers 2, 15), which is passed through on its secondary side (2) by a secondary medium (via refrigerant circuit B) to be cooled down, whereby a heat exchanger (1, 12) is provided between a feed line (the line at the bottom of heat exchanger 2) for the secondary medium and a refrigerant line leading to said injection valve (the line at the top of heat exchanger 15).

Furthermore, in the Advisory Action, the Examiner maintains that the heat exchanger combination (12 and 1) is shown as being disposed between a conduit of a secondary medium (i.e., the conduit disposed between the heat exchanger sections 1 and 2) and a refrigerant pipe leading to the injection valve (18b). The Examiner reasons that, depending on whether the expansion valve 18a is open, the refrigerant would flow from heat exchanger section 15 through heat exchanger section 15, and then to the compressor (11) and the injection valve 18b.

However, as can be seen from Fig. 45, the heat exchanger (1, 12) is not arranged in a refrigerant line leading to the injection valve (18b) of the refrigeration circuit (A), but it is arranged in the refrigerant line leading to a different injection valve (18a). Accordingly, this heat exchanger (1, 12) is by no means able to keep the temperature of the refrigerant at the entrance of injection valve (18b) constant.

Additionally with regard to Fig. 45 in Tanaka, Applicant submits that the Examiner's proposed flow of refrigerant in the Tanaka system differs from the claimed method because Tanaka fails to disclose that the heat exchanger is positioned directly upstream of the entrance of the injection valve. According to the Examiner's interpretation of the refrigerant flow in the Tanaka system, the refrigerant would flow through the heat exchanger (12) and the expansion valve (18a) and enter a closed loop comprising a heat exchanger (15), compressor (5), heat exchanger (14), and injection valve (18b). For the Examiner's convenience, annotated Fig. 45 of Tanaka is reproduced below, illustrating the proposed refrigerant flow with arrows.



According to the claimed invention, as amended, the heat exchanger (4), which thermally connects a circuit with a secondary medium (C, D) to a refrigerant line running directly to the expansion valve (6), is placed directly upstream of the expansion valve (6) to keep the temperature of the refrigerant stable directly before the expansion valve (6). For the Examiner's convenience, annotated Fig. 1 of the present application is reproduced below, showing the relative placement of the heat exchanger (4) to the expansion valve (6) by a dashed circle.

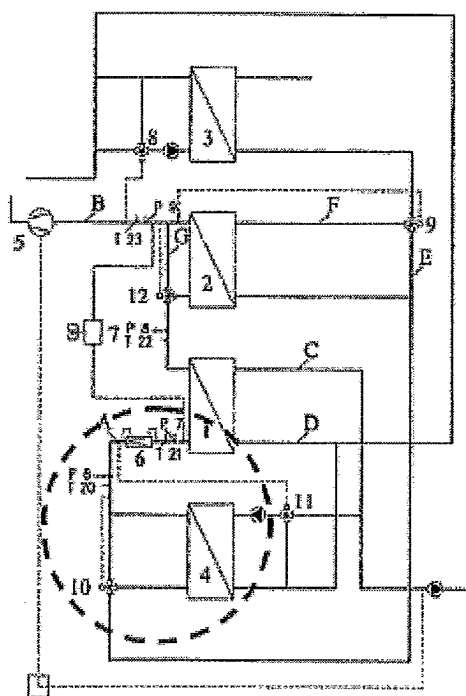


Fig. 1

As explained in the Tanaka patent (column 64, lines 23-51), item (17) denotes only a bypass passage with a heat amount adjusting heat exchanger (14). The main primary refrigerant circuit (A) comprises a compressor (11), a condenser (12), an expansion valve (18a), and an evaporator (15). Accordingly, there is no means between the condenser (12) and the expansion valve (18a), which is passed by a secondary medium to keep the temperature at the entrance of the injection valve (18a) constant, as in claims 27 and 31 of the present application. Additionally, the heat exchanger is not positioned directly upstream of the entrance of the injection valve. Accordingly, Tanaka fails to teach or suggest each and every feature of the claimed invention.

Similarly, the Pomme reference also fails to teach or suggest the elements not found in Tanaka. The Pomme patent, as illustrated in Fig. 3, teaches a completely different air conditioning circuit. The central part of the circuit, which is a so-called preliminary pressure reduction device (4), is positioned in the refrigeration circuit between the condenser (3) and a vessel (5).

The Pomme patent explains (column 1, lines 42-55): *In conventional liquid coolant loops, the coolant passes through the separating vessel at point E of the thermodynamic cycle, and passes through segment EG in the pressure reducing valve. As point E is situated in the liquid zone, the vessel is then completely filled with liquid and the quantity of coolant which it contains cannot vary. When the total mass of the liquid coolant contained in the loop falls, especially by virtue of leaks in the circuit, this reduction is performed in particular at the expense of the condenser, the undercooling capacity of which is thus reduced, which has the effect of raising the enthalpy level of the coolant at the outlet of the condenser and at the inlet of the evaporator and consequently of reducing the useful heat absorbed by the coolant in the evaporator.*

The Pomme patent then states (column 3, lines 56-60): *For the conventional loop mentioned above, in which the thermodynamic state of the fluid in the separating vessel corresponds to point E of the cycle, the plateau of the curve of Fig. 2 does not exist and the degree of undercooling varies continuously with the quantity of coolant.*

Thus, according to the Pomme patent, the continuous variation of the degree of undercooling is avoided by using the aforementioned preliminary pressure reduction device 4.

This means that combining the teachings of the Tanaka patent and the Pomme patent would result in a refrigeration circuit according to Fig. 45 of the Tanaka patent with an additional separating vessel and a preliminary pressure reduction device positioned at the entrance of said vessel at a position between the heat exchanger (1, 12) and the expansion valve (18a), unlike the invention as found in claims 27 and 31 of the present application.

The Examiner notes in the Advisory Action that the Pomme patent is cited for the teaching of the concept of keeping the temperature of the refrigerant at an entrance of an injection valve constant. The flow of refrigerant in the Tanaka system would be further changed by the addition of the separating vessel and a preliminary pressure reduction device in a manner to further distinguish it from the claimed invention. Applicant submits that the proposed combination of the Tanaka and Pomme references would not teach or suggest each and every limitation of the claimed invention, as amended.

For these reasons, method claim 27, as amended, and apparatus claim 31 are believed to be patentably distinct over the teaching of the Tanaka patent in view of the teaching of the Pomme patent. By way of their dependence upon what are believed to be patentably distinct claims 27 and 31, dependent claims 28-29 and 32-33 are themselves believed to be patentably distinct over the teaching of the Tanaka patent alone or in combination with the teaching of the Pomme patent.

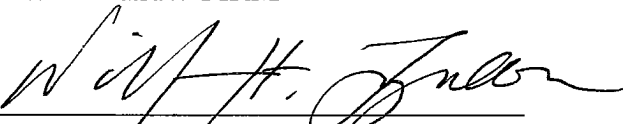
In Section No. 8 of the Office Action, the Examiner rejects claims 29, 30, and 33 under 35 U.S.C. § 103(a) as being obvious from the teaching of the Tanaka patent in view of the teaching of the Pomme patent, and further in view of the teaching of United States Patent No. 7,574,874 to Aflekt, et. al. By way of their dependence upon what are believed to be patentably distinct claims 27 and 31, dependent claims 29, 30, and 33 are themselves believed to be patentably distinct over the teaching of these references.

CONCLUSION

Reconsideration and allowance of pending claims 27-33 are hereby respectfully requested.

Respectfully submitted,

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